DOCUMENT RESUME

ED 356 969 SE 053 472

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TITLE Wetlands Are Wonderlands. Leader/Teacher Guide and Member/Youth Guide. 4-H Marine Education Series-1.
INSTITUTION Illinois Univ., Urbana. Cooperative Extension Service.
SPONS AGENCY National Oceanic and Atmospheric Administration (DOC), Rockville, Md. National Sea Grant Program.
REPORT NO IL-IN-SG-E-92-1
PUB DATE Jan 92
CONTRACT COMM-NA89AA-D-SG058
NOTE 58p.
AVAILABLE FROM Illinois-Indiana Sea Grant Program, University of Illinois, 65 Mumford Hall, 1301 W. Gregory Drive, Urbana, IL 61801.
PUB TYPE Guides - Classroom Use - Instructional Materials (For Learner) (051) -- Guides - Classroom Use - Teaching Guides (For Teacher) (052)

EDRS PRICE MF01/PC03 Plus Postage.
DESCRIPTORS Definitions; Depleted Resources; Elementary Education; Environmental Education; Habitats; Instructional Materials; *Land Use; Laws; *Learning Activities; *Natural Resources; Teaching Guides; Values; *Water Resources; *Wetlands
IDENTIFIERS 4 H Programs; Cooperative Extension Service

ABSTRACT

This guide, for a 4-H wetlands project, is designed for sixth to eighth grade youth and their leaders interested in learning and doing aquatic science activities that can help the environment. The project provides basic wetland information with one or more activities for each of six sections: (1) What is a wetland?; (2) value of wetlands; (3) wetland types; (4) products from wetlands; (5) wetland destruction; and (6) wetland regulation. Also provided is a wetlands reference list and project record sheet. The leader/teacher guide contains additional information for each activity section, answers to both the question and discussion sections, background information, sources for teaching aids and further information, and a project evaluation form. (Author/MCO)

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Wetlands are Wonderlands

Leader/ Teacher Guide

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SC 052 472

4-H Marine Education Series – 1

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IL-IN-SG-E-92-1
Revised and reprinted 1000/1-92, reprinted 500/3-88, 60/12-83
COMM-NA89AA-D-SG058

Published by the Illinois-Indiana Sea Grant Program with funding from the National Sea Grant College Program, National Oceanic and Atmospheric Administration, U.S. Department of Commerce.

This work is a result of research sponsored by NOAA, National Sea Grant College Program, Department of Commerce, under Grant #COMM-NA89AA-D-SG058. The U.S. Government is authorized to produce and distribute reprints for governmental purposes notwithstanding any copyright notation that may appear hereon.

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Issued in furtherance of Cooperative Extension Work, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture. Donald L. Uchtmann, Director, Cooperative Extension Service, University of Illinois at Urbana-Champaign.

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Project for students in grade levels 6-8

Leader/Teacher Guide for

Wetlands are Wonderlands

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Acknowledgement

Sea Grant extends a special thank you
to our reviewers Dave Turner and Pam Tazik,
for their updated information and helpful suggestions
used to revise *Wetlands are Wonderlands*.

Wetlands are Wonderlands

A 4-H/Youth Sea Grant Project

To the Leader/Teacher

Wetlands are one of our most needed and least understood resources. Contained within this guide are the following materials:

- ☐ **Information** — concepts necessary to the understanding of wetlands — what they are, why they are important, why they are sometimes threatened, and how they might be preserved.
- ☐ **Answers** to both the question and discussion sections.
- ☐ **Background information** for activities sections.
- ☐ **Sources** for teaching aids and further information.

Table of Contents

Page

I – What is a Wetland? 1

Activity 1 — Make Your Own Wetland 2

II – Value of Wetlands 3

III – Wetland Types 4

Activity 3 — Types of Wetlands 6

IV – Products from Wetlands 7

Activity 4 — Hide and Seek 7

V – Wetland Destruction 8

Activity 5 — Destruction of a Wetland 9

VI – Wetland Regulation 10

Behavioral Objectives of *Wetlands are Wonderlands* 11

Wetlands Reference List 13

Wetlands Project Evaluation Form 16

Before Starting

1. Read the *Member/Youth Guide* completely.
2. Read the *Leader/Teacher Guide* completely.
3. Note the additional resources for your wetlands unit. If these resources are desired, prior ordering of materials and scheduling of resource persons is essential.
4. Decide which discussion questions and activity options will be emphasized. (You may wish to involve your class or group in these decisions.)
5. Be ready to further define or discuss any of the vocabulary words which the students may not know.
6. Choose which of the key concepts you will stress and be ready to emphasize these as they are encountered in the text.

Overall Objectives

- ☐ To help youth understand wetlands and their value to humanity.
- ☐ To survey the current status of the uses of wetlands and future alternatives based on these uses.

Key Concepts

1. Wetlands are areas which hold water on or near the surface for a significant portion of the year. They support plants and animals which have adapted to and thrive in these wet areas.
2. Wetlands have many important natural functions including floodwater retention, groundwater recharge, and water purification. Wetlands also provide a rich wildlife habitat.
3. Many types of wetlands exist. Wetlands vary on the amount or type of water they contain; the different types of vegetation they harbor; or where they are located. Water amounts or vegetation can change rapidly in a certain area. As a result, many types of wetlands can be found next to each other as one flows into another.
4. In their natural state, wetlands are also valuable for cash crops, recreation, wildlife habitats, and aesthetics.
5. Wetlands are being, and have been, destroyed by human activities for such purposes as agriculture or commercial, industrial, or residential development. The loss of wetlands is often a disadvantage to the environment and society.
6. Today, laws and regulations exist to ensure the wise use of remaining wetlands. However, these laws need to be made more comprehensive and need to be enforced for more effective management.

Vocabulary List

(Some words may be added or eliminated depending on the level of your group.)

acid
acquisition
acre
adjacent
aesthetic
alkaline
alter
alternative
amphibians
annual
aquatic
associate

bacteria
bog

calcareous
compost
conflict
conifer
conserve
continent
corporation
cultivation
cycle

decay
decompose
derive
donation
dredge
dredge spoil

endanger
enhance
environment
erosion
exempt
expanse
extensive
extinct

fen
fertilize
floodplain
fluctuate
food chain
food web
fungus

glacier
groundwater

habitat
high water mark

impermeable
incentive
insecticide
intensive
inventory
invertebrate
irreplaceable

legally

mammals
management
marsh
microscope
migration
model
mollusk
monitor

neutralize
nitrogen
nutrient

organic

panne
peat
permanent
pesticides
polluted
predict
preservation
properties
prudent
purification

quality

recharge
reestablish
regulation
remnant
renewable
reptiles
restore
retention
revenue

saturate
seasonally
sediment
seep
sentiment
spawn
species
stagnate
status
swamp

toxic

unique

vast

water table
wetland

yield

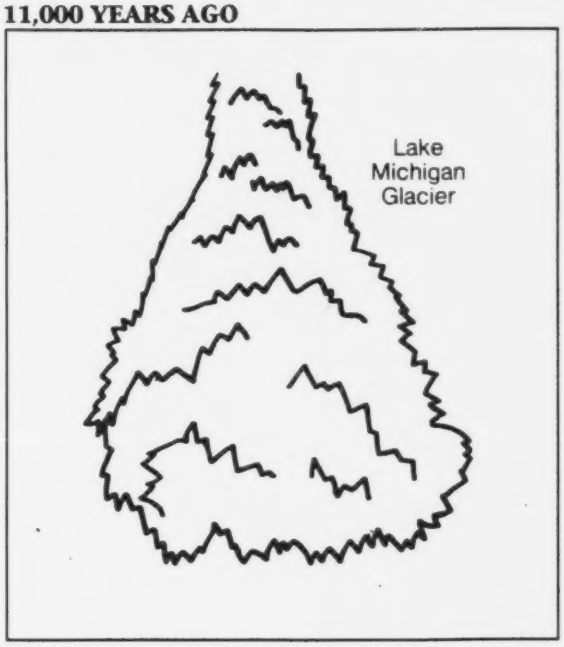
Chapter I

What is a Wetland?

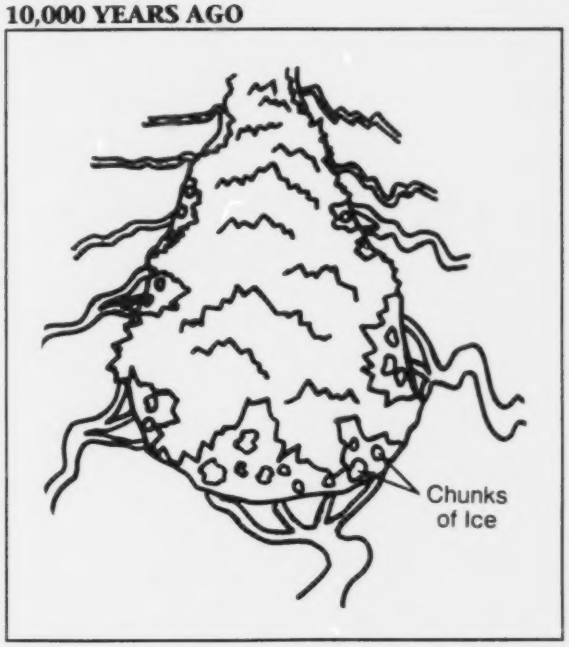
Discussion:

Glacier-formed Wetlands

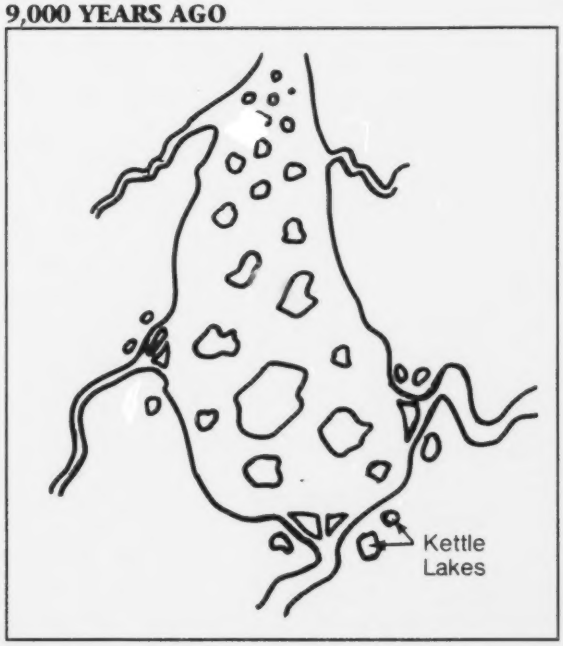
11,000 YEARS AGO



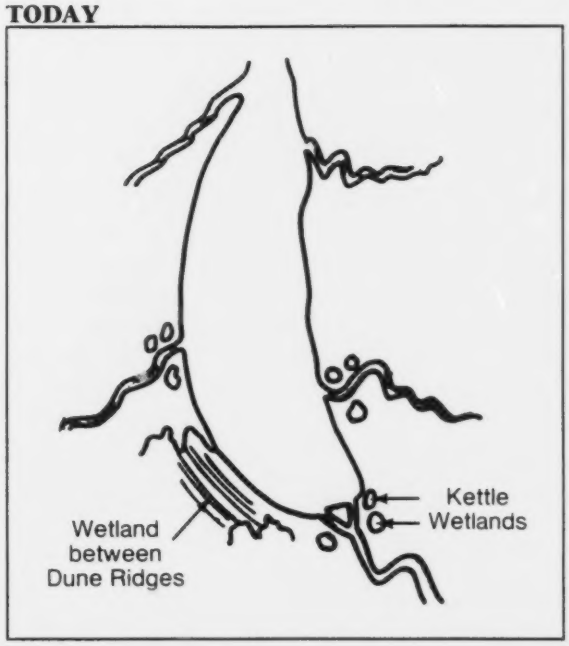
10,000 YEARS AGO



9,000 YEARS AGO



TODAY



Activity 1

Make Your Own Wetland

Refer to the diagram below as you read the following explanation of water drainage. The soil that drains most quickly is the sandy one because sand grains are coarse or large size soil particles. In simple terms, the larger the size of soil particles, the larger the size of air spaces between them, and the faster water can pass through.

The soil that drains the slowest is the clay or clay loam because clay particles are very fine or small sized. The air spaces between the clay particles are also small, so the water has a hard time passing through.

The soil that absorbs the most water is the loam soil because loam soil contains much organic material (material produced from living organisms). In other words, water droplets cling to organic particles, so less water will pass through loam soil and more water will pass through sand or sandy loam soils which contain more inorganic material.

The sand and sandy loam would most commonly be found around fast-moving rivers and Lake Michigan because the currents and waves would continually sweep finer clays and organic materials away.

The loam and clay soils would most commonly be found around ponds, marshes, or slow-moving rivers. In these low-energy environments, the finer particles and organic materials can settle to the bottom.

The other conditions required for a wetland would be plant and animal life that grows and reproduces in that type of environment. There are plants and animals that can live in each type of wetland. Some of these wetlands have different names. The 4-H members or students will learn these in Chapter III.

The amount of water required for a wetland to form is the amount necessary to sustain wetland types of plants. Water does not always have to be visible. However, the soil must be damp enough to support wetland plant life. The 4-H members or students will learn about different wetland plants and animals in Chapter II and IV.

If the holes were at the bottom of the sand or sandy loam soil containers used in Activity 1, these soils would dry out much faster and would need water more often to sustain wetland plants and animals.

Holes at the bottom of the loam, clay, or clay loam containers used in Activity 1 would not make as much difference because less water would pass through these soil types for the reasons previously explained.

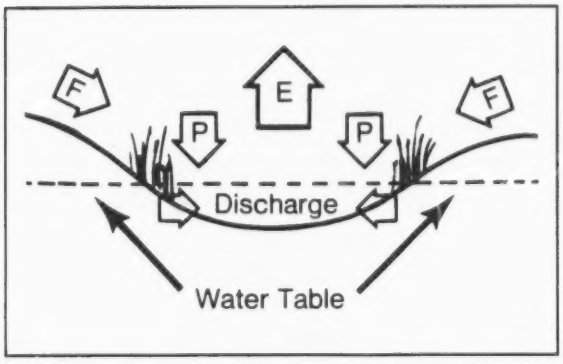
Chapter II

Value of Wetlands

Questions:

Floodwater Retention
All wetlands provide some measure of floodwater retention.

Groundwater Recharge
If the wetland is above the water table it can recharge the water table, as the wetland is doing in the picture on page 4 of the *Member/Youth Guide*. Wetlands at the same level as the water table act more as discharge areas for groundwater, particularly when evaporation (E) is greater than precipitation (P) plus overland flow (F) as shown in the diagram below.



This is an important function in areas prone to drought; when the rest of the ground dries out, livestock and wildlife can continue to graze wetlands.

If you're not sure whether the wetland is above or at the same level as the water table, try one of these suggestions:

1) Ask your local soil and water district conservationist to survey the area.

2) Survey the area yourself by looking for other open water areas. Usually, large water bodies such as lakes and rivers are located at the water table level. Compare that level with the level of the wetland.

3) Dig a hole some distance away from the wetland until it fills with water. When it fills, you have most likely hit the water table. Compare that level with the level of the wetland.

4) Drive a long stake into the ground near a wetland. Examine it periodically and note whether the end is wet. Also, once the stake is removed, the hole can be examined with a flashlight to see whether water appears in the bottom. Again, that level can be compared to the level of the wetland.

Water Purification
All wetlands perform this function. The amount that occurs depends on the wetland's size, the amount of vegetation, and the amount of water it holds. As can be expected, the larger the wetland, the more vegetation and the more water it holds. Therefore, larger wetlands can perform greater water filtering and sediment trapping. Since the different types of wetlands vary in size, vegetation makeup, and water holding capacity, wetlands perform water purification at different degrees.

Rich Wildlife Habitat
To locate a wetland containing endangered plants and animals, refer to *Illinois Wetlands: Their Value and Management*, in the Illinois Written Reference section on page 13, or refer to the Indiana Wetlands Reference Persons on page 14.

Discussion:

Examples of people's interferences with wetlands are discussed in Chapter V of the *Member/Youth* and *Leader/Teacher Guides*. These include draining, filling, polluting, damming, and dredging the wetlands to make way for other uses. Often the reasons for these interferences are due to farming, building, or dumping practices.

Chapter III

Wetland Types

Discussion:

Examples of other large well-known wetlands:

Northern Illinois:

1. Nelson Lake Marsh in Kane County
2. Des Plaines River Floodplain
3. Lake Calumet and surrounding region
4. Lockport Prairie in Will County
5. Sand Ridge Nature Preserve in South Cook County Forest Preserve
6. Waterfall Glen in DuPage County Forest Preserve

Indiana:

1. Cowles Bog and several pannes, ponds, and large marshes in the Indiana Dunes National Lakeshore and State Park
2. Kankakee Fish and Game Area in LaPorte County

The important characteristics of the *various types of wetlands* are:

Shallow lake — A large shallow body of water that is usually loaded with vegetation. Examples of the vegetation are: emergent plants such as cattails; floating vegetation such as lily pads and duckweed; and visible submergent (below water surface) vegetation. Because of its shallowness, this lake may contain islands.

Natural pond — Similar to the shallow lake but smaller in size and shallower in depth.

Bog — The important difference between a bog and other wetlands is that it contains acidic water. A bog can be all depths and sizes. It was usually formed in this region when a glacier-made depression contained water that had become acidic from both dying vegetation and a lack of soils that could neutralize this acidity. Sphagnum moss likes to grow in acidic water. This moss produces more acidity so the bog retains it acidic nature. Sphagnum moss forms a floating mat on top of the exposed roots of sedge grasses. This mat of moss and sedge is strong enough at the outer edges for trees to grow on and for people to walk on. Because plants can't use the acidic water for nutrients, several of them have become carnivorous and trap insects. Tamarack trees are common in bogs.

Fen — A fen has water that is alkaline. The water retains its highly alkaline nature because it is fed by water seeping from calcareous rock or glacial till which is primarily alkaline. It contains plants that tolerate or like alkaline water. Because of few nutrients, unusual vegetation, similar to the carnivorous plants of a bog, can be found in a fen.

Panne — This wetland is similar to a fen except that it forms in areas of very sandy soil. In this region, pannes formed between the sand dune ridges along Lake Michigan and among the remnant dunes of the older glacial lake. Some of the vegeta-

tion, particularly many types of grasses, are there due to their need for sandy soil. Mollusks such as mussels are found here because they need the sandy bottom to move around. Fish such as bluegills will be found here because they need the sandy bottom to spawn.

Marsh — A marsh usually contains shallow water. Its most characteristic feature is that it usually has few shrubs and trees. Instead, a marsh contains emergent plants such as cattails, bulrushes and sedges; although water lilies and some submergent vegetation do occur in the deeper areas.

Wet meadow — This is the driest type of wetland. Usually there is little standing water, but the ground remains soggy for much of the year. Mainly grasses and vegetation that prefer moist soil will grow here.

Swamp — An important characteristic of this type of wetland is that woody plants such as shrubs and trees dominate the area. In northern Illinois and Indiana, most of the swamps are shrub swamps where less than 20 percent of the vegetation is trees. Swamps are often found along pond margins or in floodplains.

Stream margin — This can be a number of different types of wetlands depending on the water depth. This designation mainly implies a certain region where wetlands can be found (i.e., along the edges of streams).

Floodplain — Like a stream margin, this applies more to where wetlands are found rather than a certain type. All rivers have adjacent land upon which the river overflows at least once a year. Often this land is forested by water tolerant trees but can contain marshes, ponds, and wet meadows.

Artificial wetland — This can be any of the above described wetlands. The key difference is that an artificial wetland is created by humans where previously no wetland existed or where a wetland had previously been destroyed.

Examples of Wetlands Types

1. Shallow lake — Lake Calumet

2. Natural pond — Sand Ridge Nature Preserve; farmer's ponds (although some may be artificial)

3. Bog — Pinhook Bog

4. Marsh — Any place you see masses of cattails and rushes; nearly all the examples of large marshes that are in Chapter III of the *Member/ Youth Guide.*

5. Fen — Cowles Bog, Indiana Dunes National Lakeshore; Volo Bog, McHenry County; and Waterfall Glen

6. Panne — West Beach at Indiana Dunes National Lakeshore; Sand Ridge Nature Preserve

7. Wet meadow — Lockport Prairie; Sand Ridge Nature Preserve; Waterfall Glen

8. Swamp — Sand Ridge Nature Preserve; Indiana Dunes National Lakeshore

9. Stream margin — edge of any local stream

10. Floodplain — on either side of any large river

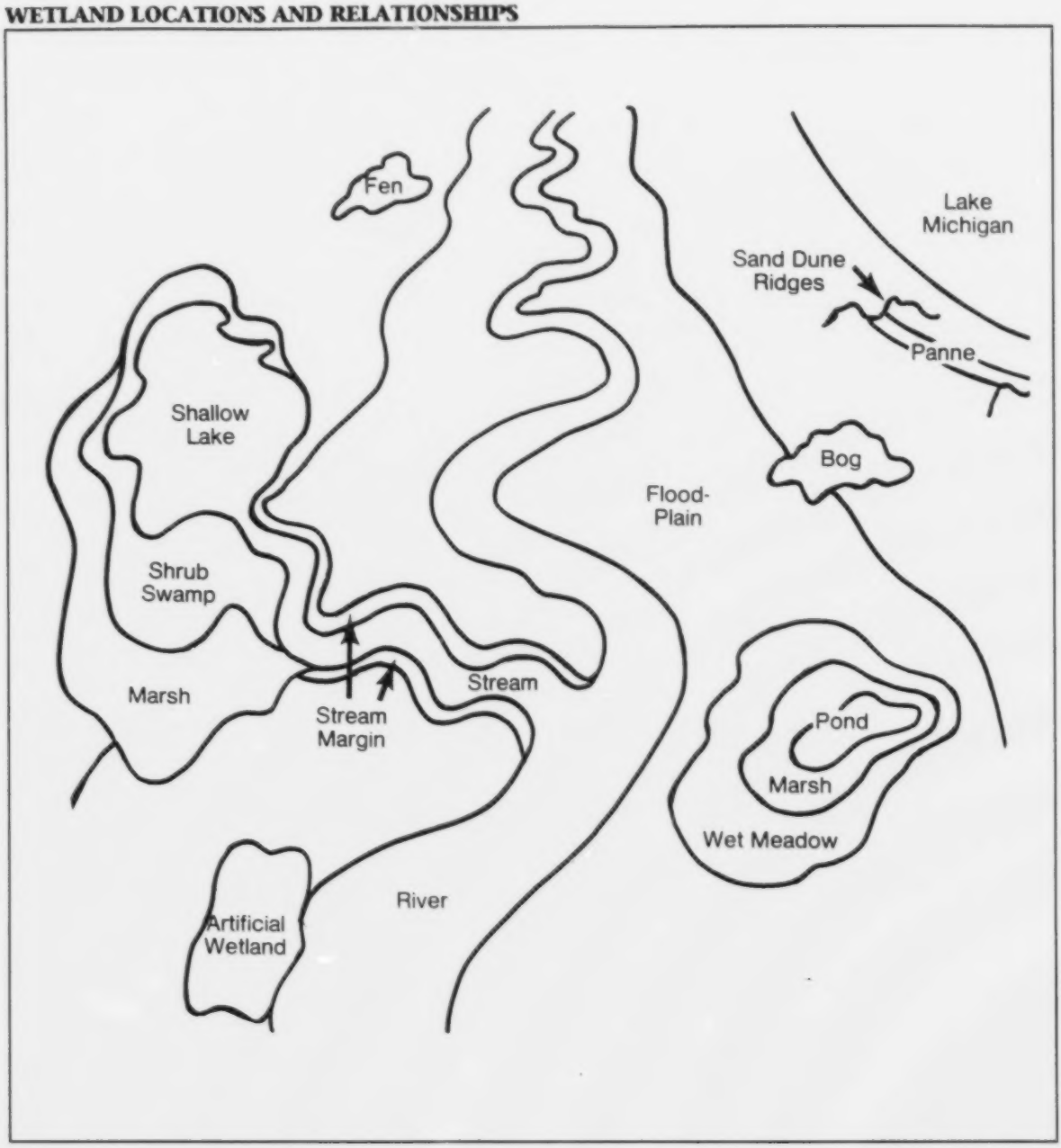
11. Artificial wetlands — Schaumburg, IL, (for runoff from the commuter rail station parking lot); Des Plaines River near Wadsworth, IL

Activity 3

Types of Wetlands

The previous examples of wetlands should be helpful for this activity. For additional information, refer to the reference list at the end of this guide.

WETLAND LOCATIONS AND RELATIONSHIPS



Chapter IV

Products from Wetlands

Questions:

For more information on wetland dependent plants and animals, refer to the *Science Notes* published by the Chicago Academy of Sciences and listed in the reference materials at the end of your *Leader/Teacher Guide.*

Discussion:

Refer to the *Science Notes* to find how wetlands are used by various plants and animals.

Regarding mosquitoes, the larvae and pupae stages of this insect live in the wetland water environment. Mosquito larvae and pupae are important parts of the wetland food web. They eat microscopic plants and animals or organic debris. The larvae or pupae are in turn eaten by small crustaceans such as the water flea, copepod, or crayfish. These crustaceans are in turn eaten by frogs, turtles, fish, birds, and mammals such as raccoons.

Mosquitoes and man are in constant battle because female adult mosquitoes are blood suckers. In fact, many types of female mosquitoes require a meal of blood before they are able to lay eggs. To compound the problem, some kinds of mosquitoes can transmit diseases such as malaria, yellow fever, or encephalitis. However, those disease-carrying kinds are primarily found in the tropics.

Because the mosquitoes hatched in Illinois or Indiana wetlands are primarily a nuisance, man has sprayed insecticides in large quantities to eliminate them. At first DDT was commonly used. However, scientific studies showed that birds and animals that ate DDT-sprayed mosquitoes often could not bear young, their eggs didn't hatch, or the shells broke. In many cases, if the young were born, they were deformed. Therefore, DDT was banned for most uses in the late 1960s. Other insecticides are now being used with few short-term problems, but their long-term effects on animals that eat mosquitoes are starting to concern scientists. Since many of the insecticides tend to accumulate in the animals, scientists are carefully monitoring their use.

Activity 4

Hide and Seek

Newborn fish and smaller fish of many types like weed beds because they can hide from predators. Weed beds also offer a food supply as many smaller plants and animals can be found floating around or attached to many of the weeds. Northern pike, in particular, take advantage of this survival tactic by using wetland weed beds for spawning grounds.

To learn more about "food chains" refer to the *Science Notes* at the end of this guide.

Chapter V

Wetland Destruction

Discussion:

Since destroyed or altered wetlands are plentiful, one way to answer the discussion question is for you to first think of all the new development that has occurred in your neighborhood, city, or county. List all the new development regardless of whether or not you know it was once a wetland. The list can include commercial, industrial, and housing development plus public institutions and roads. Don't forget new developments in progress. Additional threats to wetlands that you may not be aware of are off-road vehicles, grazing activities, lake conservation, peat-mining, and gravel pit expansion.

Once you've made this first list, try to identify land on which development occurred that used to be "wet" or marshy. Make a column next to your list to keep track of the ones that used to be wetlands. Also, think of wetlands near the development because they can also be impacted, particularly with respect to pollution.

Five examples of pollution impacts include:

1. groundwater seepage from septic tanks, solid waste, or toxic waste dumps;
2. air pollution which attaches to dust particles or rain droplets and falls into wetlands;
3. run-off from farmers' fields with fertilizers, pesticides, or livestock waste, and run-off from roads with oil, exhaust, and salt;
4. sediment from soil erosion; and
5. aquatic herbicide spreading from a nearby lake (aquatic herbicide is used to control aquatic plants).

Unfortunately, the only way a polluted wetland is noticeable to the average person is by obvious signs: lack of plant or bird life, distasteful odors, or "unsafe water" signs. Pollution is often so gradual that it still goes unnoticed.

From your list, try and determine which of the developments or other threats to wetlands have caused wetland pollution. Also determine which of these developments or other threats caused the wetlands to be filled in or drained. Make a third column and add the type of wetland alteration or destruction. Your completed list should look like the example on the following page.

Example

(Name of Neighborhood, City, or County) _____

Development or Other Threat	Previously a Wetland?	Type of Wetland Alteration/Destruction
1. New housing development on Main Street	Yes	Filling and draining part of it and converting another part into a lake
2. A grocery store on 7th Street	No	
3. A new road in Beaver Park	Yes	Exhaust and oil run from cars and trucks; soil erosion from the steep banks of the road
4. Etc.	Etc.	Etc.

Introduce this list to your students or 4-H members. See if you can add to the various columns. The result will be a very educational discussion.

Activity 5

Destruction of a Wetland

The lessons that this activity shows are fairly self evident in procedures 1 and 2. In procedure 3, do not forget that if the fish can move to deeper water they will do that first rather than die in the destroyed wetland. In procedure 4, the answer that is sought is to preserve the wetland as a park or other public educational area, such as a nature preserve.

Chapter VI

Wetland Regulation

Discussion:

Refer to the list you created for Chapter V — *Wetland Destruction.* Can any of these wetlands be saved or at least minimally altered as development proceeds? Make suggestions on possible protection measures to the students or 4-H members and get their reactions. Ask them about any other wetlands that are currently threatened in your neighborhood, city, or county. Ask what can be done to protect or at least make development compatible with them.

For a more complete listing of important unprotected wetlands in you area refer to:

Illinois:
Table 10 in the Appendix of *Illinois Wetlands: Their Value and Management.*

Indiana:
The Indiana Wetlands Reference Persons on page 14.

These references are more thoroughly cited in the reference list at the end of this guide.

Behavioral Objectives of Wetlands are Wonderlands

Upon completion of the activities in this guide, the 4-H member or student should be able to:

(Following Chapter I)

1. Define a wetland.
2. Diagram three causes of wetland formation.

(Following Chapter II)

1. Describe up to four benefits of wetlands.

(Following Chapter III)

1. Describe several types and locations of wetlands.

(Following Chapter IV)

1. Describe the natural productivity of wetlands.
2. Cite several recreational benefits and commercial uses of wetlands.

(Following Chapter V)

1. Describe the "greatest destroyer" of wetlands and reasons for this destruction.
2. Describe the benefits of drained wetlands.

(Following Chapter VI)

1. Name three agencies presently involved in wetlands management.
2. Name three laws or programs which affect wetlands.

Member Achievement

The demonstrations in this unit are only one means of displaying achievement. Member development begins with broadened understanding of wetlands and their essential value. Members are offered many opportunities to learn about wetlands, to learn about interrelationships, and to see their own skills and knowledge develop. The accomplishment of the activities should result in pride of performance which is then visibly displayed through public demonstration.

Interdependence

Throughout this unit, it is of value to stress the interactions that occur between air, soil, water, plants, animals, and people. Treating one part of the ecosystem individually aids member learning. However, it is important that members understand how all the parts of an ecosystem fit together, each part affecting the others. Wetlands offer an exceptional opportunity for relating all parts of the environment together.

Indoor and Outdoor Activities

The activities in this project include some which may be conducted indoors and outdoors. The convenience of indoor activity is, however, supplementary to the dynamic outdoor environment. Weather and seasonal variations provide a broad range of excellent opportunities for additional activities, and further understanding of wetlands, as an essential part of our environment, through direct experience. Some of the experiences may be especially effective when conducted as group experiences, while others offer particular value as individual experiences.

Safety Tip

When a field trip is conducted, there are some potential hazards involved. Illinois and Indiana wetlands contain the Massasauga rattlesnake (shown below). Also, poison ivy (illustrated below) may be present. Poison sumac may also be found in bogs or fens. Deep mud or stinging nettle (shown below) may be present on either side of a trail. The safest and easiest precaution is to use a naturalist to help conduct a hike through the wetland. He or she will know if any hazards exist at that particular wetland and what precautions to take. Naturalists are employed by County forest preserves or State and Federal parks.

RATTLESNAKE

POISON IVY

STINGING NETTLE

BEST COPY AVAILABLE

Wetlands Reference List

Illinois Wetlands Published References

Beecher, W. J., *Chicagoland Pond Life,* (Two Parts), *Science Notes,* Chicago Academy of Sciences, no date. (Copies can be obtained for 5 cents each from the Chicago Academy of Sciences, Education Department, 2001 North Clark Street, Chicago, Illinois 60614, Ph: 312/871-2668 ext. 2034)

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Illinois Wetlands Reference Persons

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   524 South Second Street
   Springfield, IL 62701-1787
   217/782-3715

4) Contact your local County Forest Preserve Districts

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   718 N. Walnut Street
   Bloomington, IN 47401
   812/334-4264

3) Contact your County Soil Conservation Service office

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The Illinois-Indiana Sea Grant Program needs your help! After teaching this project, please take a few minutes to complete the following evaluation. It will help us in future revisions of this project, as well as in the development of related projects. Any additional comments would be especially appreciated. Upon completion of the evaluation, please send it to: Robin Goettel, Illinois-Indiana Sea Grant Program, University of Illinois, 65 Mumford Hall, 1301 W. Gregory Drive, Urbana, IL 61801.

Wetlands Project Evaluation Form

1. This project was taught in:

_____ County, IL
(name of county)

_____ County, IN
(name of county)

2. It was taught at:

☐ school

☐ a 4-H Club function

☐ _____
(other place)

3. Number of youths involved: _____

4. Grades or ages of youth: _____

5. Which chapters were taught? _____

6. Which activities were completed? _____

7. Which optional projects were completed? _____

Other comments? _____

_____

_____

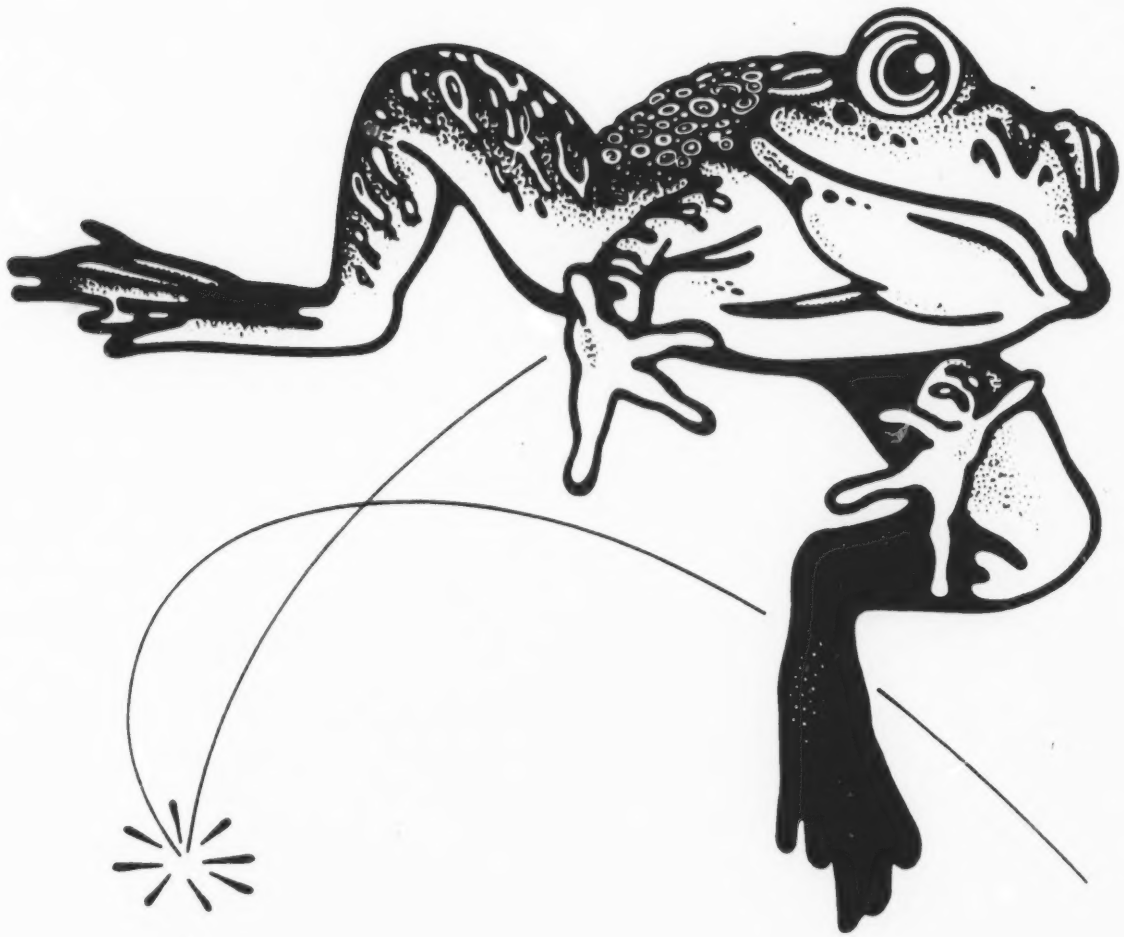
_____

_____

Thank you!

Wetlands are Wonderlands

Member/Youth Guide



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4-H Marine Education Series – 1

4-H Youth Programs, Cooperative Extension Service,
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IL-IN-SG-E-92-1
Revised and reprinted 3000/1-92, reprinted 1000/11-87, 2000/9-85
COMM-NA89AA-D-SG058

Published by the Illinois-Indiana Sea Grant Program with funding from the National Sea Grant College Program, National Oceanic and Atmospheric Administration, U.S. Department of Commerce.

This work is a result of research sponsored by NOAA, National Sea Grant College Program, Department of Commerce, under Grant #COMM-NA89AA-D-SG058. The U.S. Government is authorized to produce and distribute reprints for governmental purposes notwithstanding any copyright notation that may appear hereon.

The Illinois-Indiana Sea Grant Program is a federal and state program administered through the University of Illinois at Urbana-Champaign and Purdue University at West Lafayette, Indiana.

Issued in furtherance of Cooperative Extension Work, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture. Donald L. Uchtmann, Director, Cooperative Extension Service, University of Illinois at Urbana-Champaign.

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Project for students in grade levels 6-8

Member/Youth Guide for

Wetlands are Wonderlands

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Acknowledgement

Sea Grant extends a special thank you to our reviewers:
Marvin Hubbell, Dave Turner, and Pam Tazik
for their help in revising *Wetlands are Wonderlands*.

Wetlands are Wonderlands

A 4-H/Youth Sea Grant Project

Introduction

Have you ever wondered how wetlands were created, or which animals and plants rely on wetlands for survival, or what people are doing to protect our nation's wetlands?

Wetlands are Wonderlands can answer these questions and more. This special guide is designed for youths in grades six through eight interested in learning and doing aquatic science activities that can help the environment. In fact, anyone can tackle this project and learn how to conserve the environment.

The project provides some basic information about wetlands with one or more activities for each of the six sections.

Table of Contents

I — What is a Wetland? 1

II — Value of Wetlands 4

III — Wetland Types 8

IV — Products from Wetlands 10

V — Wetland Destruction 13

VI — Wetland Regulation 16

Wetlands Reference List 20

Record Sheet 23

Highlights of Project Activities

Activity 1
Make Your Own Wetland — Demonstrate how wetlands are formed and show their unique properties. Use four jars with varying amounts of different soils, organic matter, and water.

Activity 2
Life in a Wetland Soil — Investigate the life forms in a wetland soil and observe the activity of some of the organisms.

Activity 3
Types of Wetlands — Display different types of wetlands using magazine photographs. Identify at least four types.

Activity 4
Hide and Seek — Demonstrate the value of wetlands to wildlife. Set up an aquarium and show how wetlands help produce fish.

Activity 5
Destruction of a Wetland — Use your jars from Activity 1. Demonstrate what happens to toxic materials in a wetland by adding food coloring to a wetland jar. Demonstrate the draining or filling of wetlands in other jars.

Activity 6
Guest Speaker — Ask a speaker to discuss the history and current status of wetland regulation. The speaker could discuss actions you can take to protect wetlands, wildlife or plants found in wetlands, or the history of wetlands in your area.

Activity 7
Field Trip — Have your adult leader, teacher, or a naturalist guide you through a wetland and let you see, hear, and feel many of the things you have learned about wetlands in these chapters and activities.

"Wetlands Conservation" is the wise use of our wetlands. It includes the preservation, the maintenance, and the development of wetlands for a quality environment.

Chapter I

What is a Wetland?

Illinois and Indiana wetlands teem with life and support many animals and plants that cannot live in any other environment.

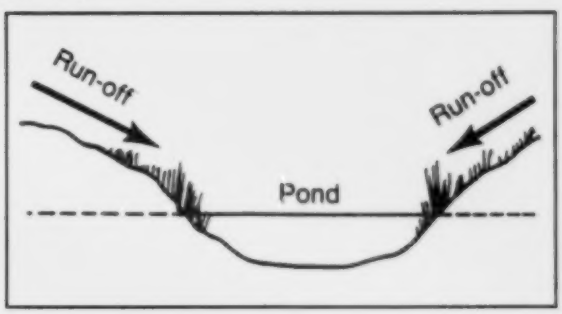
More than twice as many threatened or endangered species live in our wetlands than any other habitat.

Question:
What do you think a wetland is?

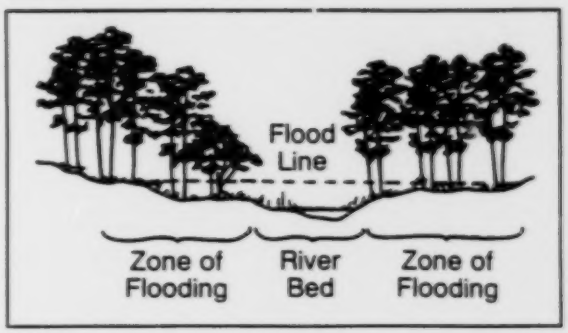
Answer:
In simplest terms, a freshwater wetland is an area that is saturated by water long enough to support plants that require wet conditions to grow. Wetlands are dynamic ecosystems, changing over time and space. Wetlands generally include swamps, marshes, bogs, and similar areas.

Generally, freshwater wetlands develop when water is a dominating factor. Wetlands commonly occur under the following conditions:

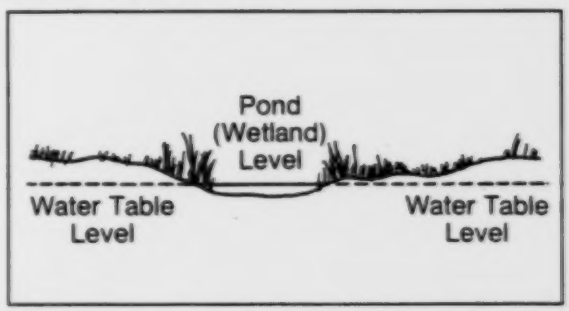
1) When all the surrounding land slopes toward a basin or low area so that water flows into it;



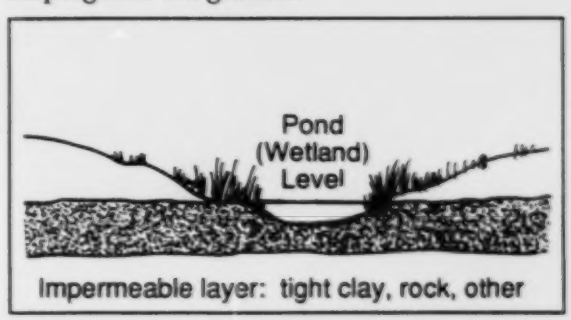
2) When the land is flat and adjacent to a lake or river so that shallow areas form around the edge of the water body and become larger and deeper during floods or other periods of high water;



3) When the water table occurs very near or above the surface; or

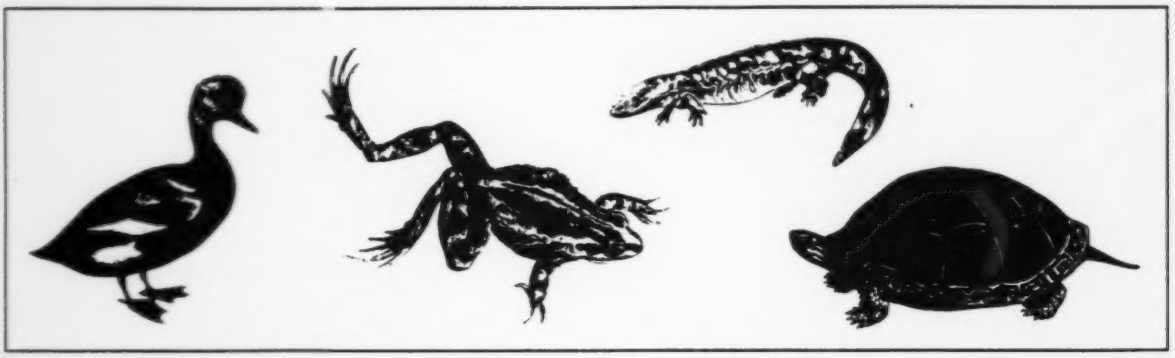


4) When the soil types prohibit the water from seeping into the ground.



Often more than one of these conditions occur at the site of a wetland. For example, river wetlands can form when water collects from sloping land and the land closest to the river is flat. Another example is when a pond forms at the level of the water table, but the water table forms because it sits on top of a rock layer.

One of the easiest ways to identify a wetland is by the organisms that prefer to live there. Some common examples of plants are cattails and water lilies. Some common examples of animals are frogs, salamanders, turtles, ducks, and muskrats.



In the northern region of Illinois and Indiana, many of these wetlands were formed during the last ice age. Not only were all the Great Lakes formed by huge glaciers, but many wetlands were formed due to some related conditions:

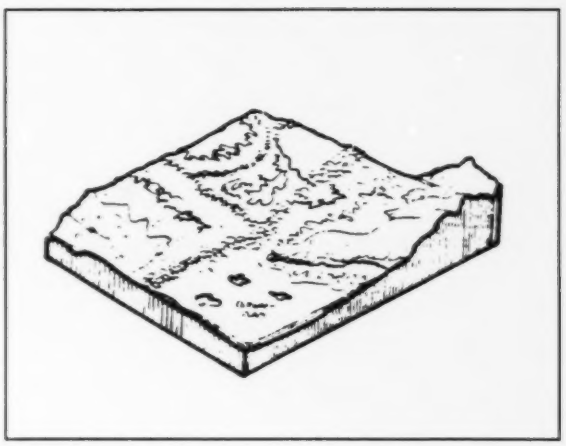
1) When the climate warmed, chunks of ice split from the glacier. As the climate continued to warm, the Great Lakes, such as Lake Michigan, shrank in size, isolating some of these ice chunks on land. They melted to form deep but small lakes called "kettle lakes." Some of these kettle lakes filled in with soil and vegetation to become wetlands.

2) Shrinking Lake Michigan also left behind rows of old sand dunes. In the depression between the dune ridges, long, narrow wetlands formed.

Discussion:

1. Do you have any wetlands near your home? How do you know it is a wetland?

2. How do you suppose that wetland was formed? Does it fit one of the ways described above? Which one or combinations does it fit?



KETTLE LAKES

Optional:

1. Study the glaciated time of Lake Michigan and show in your region where wetlands have formed from the melted glaciers.

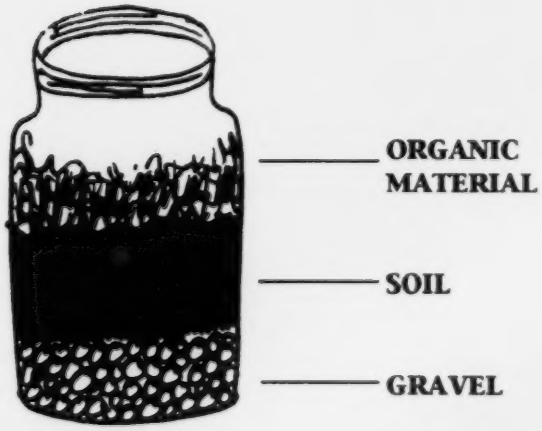
Activity 1

Make Your Own Wetland

This activity demonstrates some of the properties of wetlands and how they are formed.

Materials Needed:

- ☐ 4 wide-mouth jars or cut off clear bottoms of plastic pop bottles of equal size.
- ☐ 4 kinds of soil:
  - a) sand (or kitty litter)
  - b) loam (potting or garden soil)
  - c) sandy-loam (combine sand and loam)
  - d) clay or clay loam (natural clay in 5-pound bags can be bought in an art supply store)
- ☐ organic material: peat moss, sphagnum moss, or undecomposed compost
- ☐ small gravel
- ☐ source for obtaining and disposing of water
- ☐ 4 cups



Procedure:

1. Label each jar showing what type of soil will be put in each one.

2. Place 1 inch of gravel in the bottom of each jar. Add a different soil to each jar until half full. Pack all the soil firmly into the jar, particularly the clay and loam soils. Add 1 inch of organic material.

3. Fill the four cups with water. Pour all cups at the same time, one into each jar. Watch what happens at the bottom of the jar.

Which soil type drains most quickly? Why?

Which soil type absorbs the most water before showing puddles?

Which of these types of wetlands would be most commonly found around fast-moving rivers or Lake Michigan?

Which of these types of wetlands would be most commonly found in ponds, marshes or around slow-moving rivers?

4. All of these containers now satisfy one of the conditions for being a wetland. Discuss what other condition would be required for these containers to be "real" wetlands.

5. Discuss the amounts of water necessary for the formation of a wetland. These containers do not have any drainage. How would holes in the bottom of the containers affect your results?

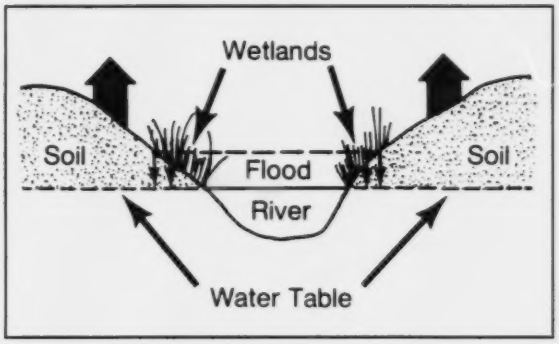
6. If you plan to do Activity 5, *Destruction of a Wetland,* save these containers, as they are now, for use with the activity.

Chapter II

Value of Wetlands

Wetlands provide important benefits often overlooked. When a river floods, it can overflow into wetlands before it reaches dry land. (See diagram below.)

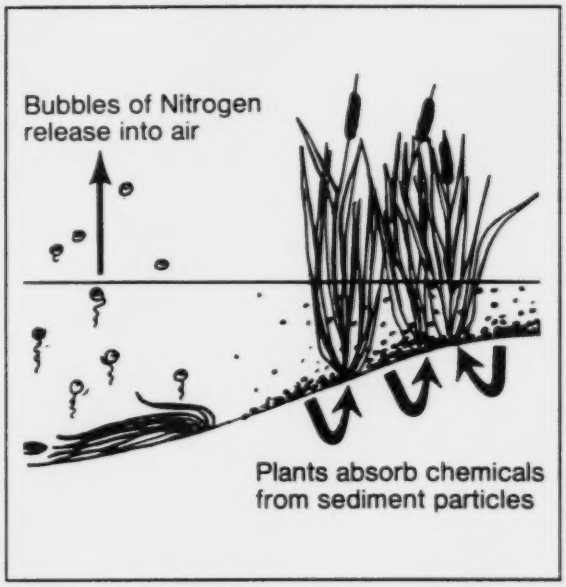
Wetlands also release the floodwater slowly, reducing the impact of flooding farther downstream. Since homes and other structures may be built near the river, wetlands can prevent flood damage to them. This wetland function is called *floodwater retention.*



As the above diagram also shows, water in wetlands may seep down into the soil until it reaches the water table or groundwater. Some homes depend on the water table to supply drinking water through wells. If wetlands did not constantly supply the water table with additional water, these wells would dry up. This wetland function is called *groundwater recharge.*

In Illinois and Indiana, most wetlands serve predominately as discharge areas. Although the same wetland may serve as both a recharge and discharge area depending on the time of the year and weather.

A third important value of wetlands is that they usually trap sediments and filter chemicals. Otherwise some of these sediments and chemicals would pollute the water that is connected to the wetland.



As the diagram above illustrates, wetlands provide *water purification* in four ways:

1) Silt or sediment particles settle in wetlands where fewer currents and waves exist.

2) Some chemical compounds attach to these sediment particles and settle to the bottom.

3) Plants absorb some of the good and bad chemicals for food.

4) As plants and animals die in the wetlands, bacteria and fungi use this decaying matter for food. In the process, bubbles of nitrogen are released into the air instead of remaining in the water. Excess nitrogen in the water would over-fertilize plant life and cause too much growth for a healthy wetland.

A final important value of wetlands is that they provide *rich wildlife habitat.* Without these wetlands, many species of both plants and animals would become extinct. In fact, in northern Illinois nearly 80 plants alone are threatened because the wetlands are threatened. A similar number of threatened plants have been found in the Indiana Dunes National Lakeshore because numerous and varied wetlands are threatened there, too.

Forty percent of Illinois' threatened and endangered species depend upon wetlands for a significant part of their life cycle. Yet wetlands comprise only 2.6 percent of the landscape.

Question:

Do you know of a wetland that may be performing one or more of these four functions: floodwater retention, groundwater recharge, water purification, or wildlife habitat?

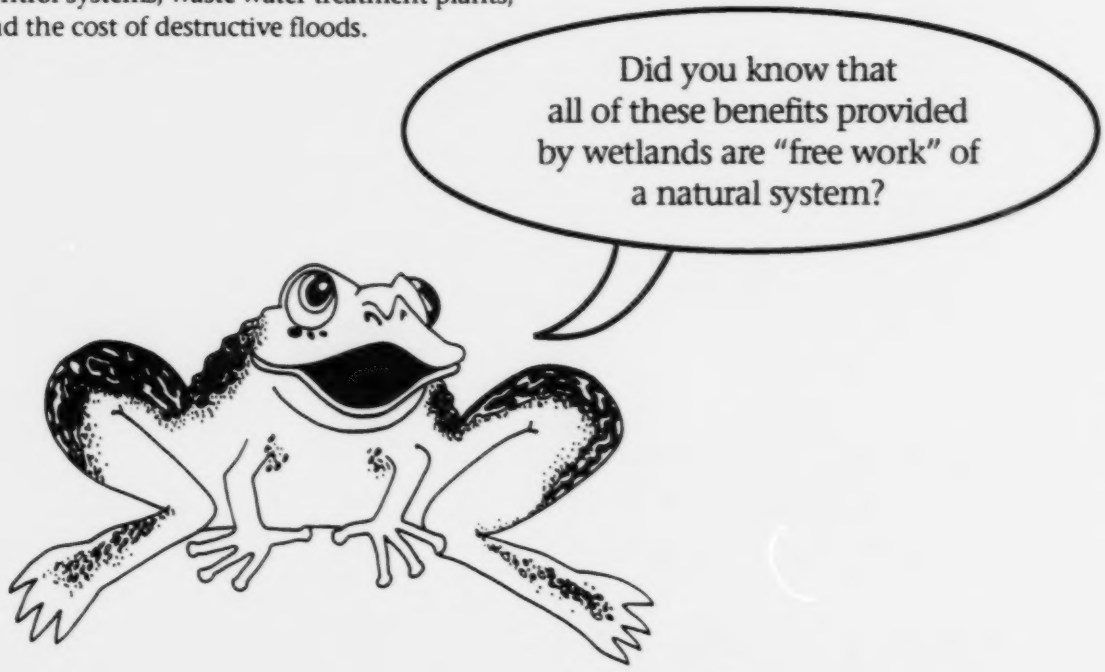
Discussion:

Discuss how people may or are causing too much silt and chemicals to enter wetlands. What impact do these substances have on wetlands?

Discuss how people have interfered with nature. Where wetlands have been eliminated, we must pay to provide the same benefits, such as storm water retention ponds and waste water treatment plants, or suffer the consequences of polluted water and damage from storms and floods. We all know about the high costs of construction of storm water control systems, waste water treatment plants, and the cost of destructive floods.

Optional:

Discuss river areas you know of in Illinois or Indiana or in other states where annual flooding has caused damage to homes and other property. Determine what can be done about this problem. Or select one or more of the bad floods that have plagued the nation, and discuss how people's activities may have contributed to these floods.



Activity 2

Life in a Wetland Soil

Many wetland life forms spend part of their annual life cycle in "resting" stages in the soil. Try the following activity to observe some of these organisms.

Materials Needed:

- ☐ A 5- or 10-gallon aquarium (a screened lid that prevents insects, etc. from escaping)
- ☐ 3 gallons of tap water
- ☐ A chunk of soil about 1 foot x 1 foot x 8 inches deep from a wetland near you or from an area which is flooded with unpolluted to moderately polluted water every year (a river bank is excellent)
- ☐ A wetland or pond guide, or some reference booklet which will help you to identify different kinds of wetland life
- ☐ A magnifying glass or low-power microscope
- ☐ A light source
- ☐ A source to maintain room temperature (ex: a constantly lit 60-watt light bulb)

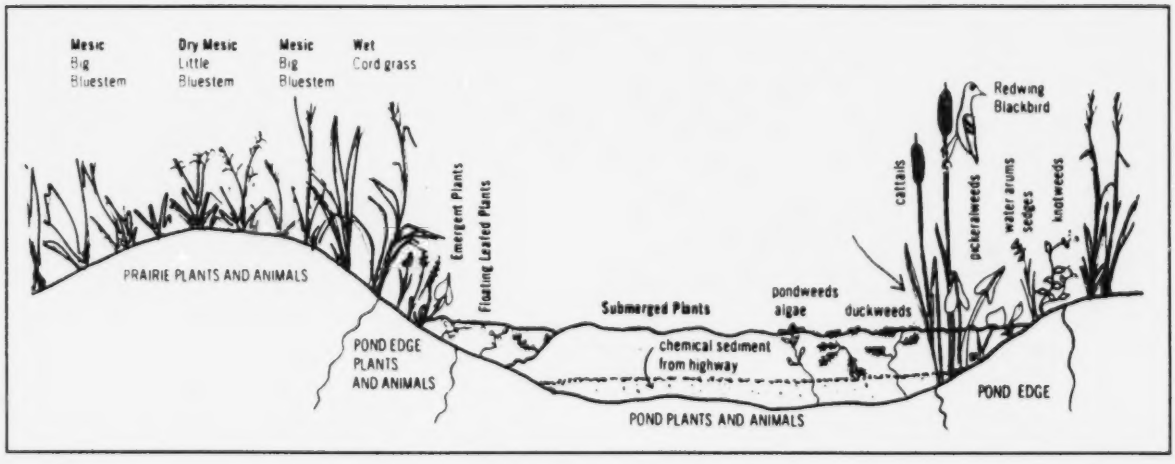
Procedures:

1. Place an empty aquarium in a spot where it can receive plenty of light and remain undisturbed for later observation.

2. Add the three gallons of tap water and let it stand for one day to let some of the water treatment chemicals break down. During that first day make sure the aquarium does not leak.

3. Gently place the soil into the aquarium. The more vegetation growing out of the soil, the more organisms that will emerge from the soil.

4. After one or two weeks, look closely at the aquarium water. (Don't let the water stand much longer as it will stagnate, become inactive.) Using a guidebook and magnifying glass or microscope, try to identify the life forms you see. Where did they come from?



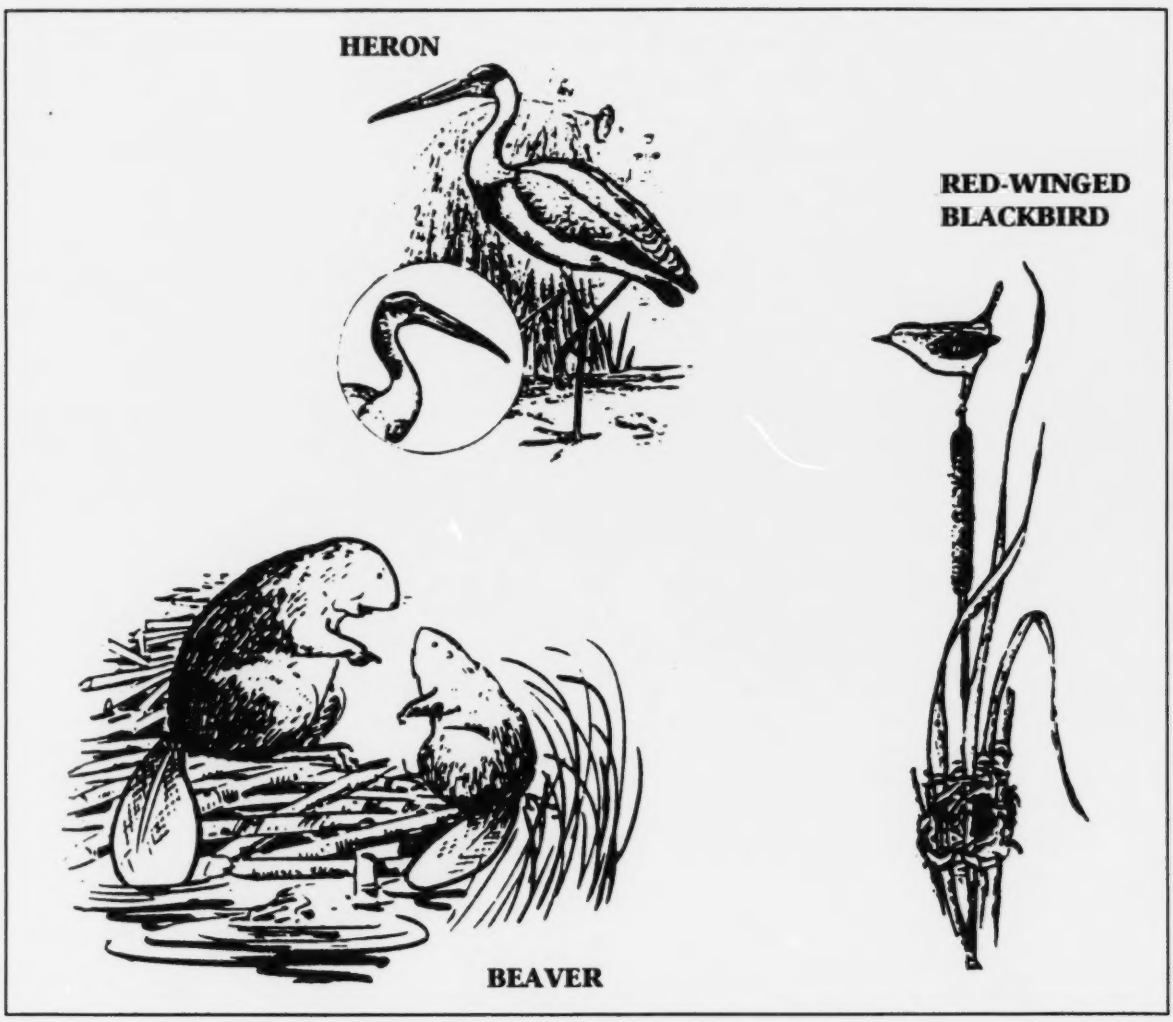
Optional Projects:

Conduct a library project on life cycles of wetland/pond dwellers.

or

Learn about some wetland plants and animals. Write a paper on one or more of the following species and discuss what you learned:

water lily	black bullhead	green frog
sandbar willow	beaver	American Toad
black walnut	muskrat	fox snake
bottlebrush sedge	red-winged blackbird	tiger salamander
reed canary grass	American bittern	dragon fly or mosquito
northern pike	great blue heron	



7

Chapter III

Wetland Types

Illinois and Indiana are blessed with a variety of wetlands. The different types of wetlands are productive or beneficial to us in different ways.

Wetlands are changeable and may not always be wet. But they are wet enough most of the time to support vegetation and wildlife which require water-saturated soils to grow and reproduce.

Numerous small wetlands dot the states of Illinois and Indiana and may be found in every county of these states, along most lakes and streams, and all around Lake Michigan.

Shallow lakes, natural ponds, bogs, marshes, fens, pannes, wet meadows, swamps, stream margins, floodplains, and artificial wetlands are all types of wetlands that can be found in Illinois and Indiana.

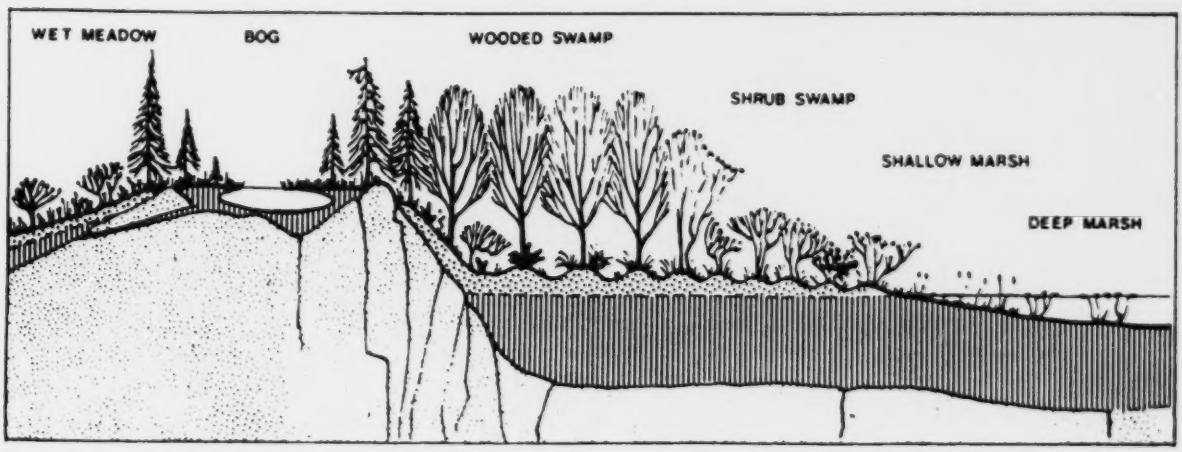
Examples of some significant wetlands are the Dead River Marsh area of Illinois Beach State Park near Lake Michigan, the Volo Bog in McHenry County of Illinois, the Pinhook Bog in Indiana Dunes National Lakeshore, and the Kankakee River Floodplain which travels through many counties of northern Indiana and Illinois.

Discussion:

1. Can you name any large wetlands other than those listed in Chapter III?

2. Describe some of the types of wetlands mentioned. Try to identify an example of some of these wetlands, especially if there is one in your area.

3. Wetlands are often created by highway construction. Can you think of any places like this? (Hint: Where do you see cattails along the highway?)



Activity 3

Types of Wetlands

Cut out magazine or newspaper pictures of wetlands. Or you may want to take photos of nearby wetlands. Display the pictures and photos. Below each one, write the name of the type of wetland.

Optional:

Select a type of wetland or one of the specific examples listed in this chapter and write a paper on it. Describe it; tell where it is located; describe what soils, plants, and animals are found in it; and explain how it was formed. Is it providing any of the important benefits discussed in Chapter II?

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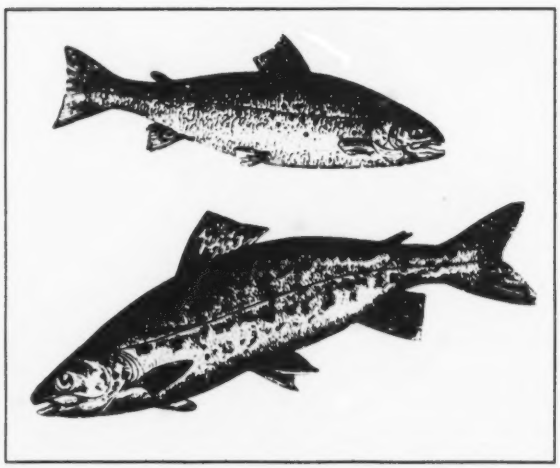
Chapter IV

Products from Wetlands

Most wetlands are naturally productive. The soils of these natural areas are rich with nutrients carried to them in surface water run-off from surrounding higher lands.

Natural products from wetlands often exceed the yield of modern agricultural fields which require intensive cultivation and fertilization each year.

Various wetlands are noted for a variety of *cash crops*. Among the more important crops are grass hay, fish, lumber, fur-bearing animals, and berries, such as cranberries or blueberries.



Peat mining takes place in Cook, Lake, Henry, and Whiteside Counties of Illinois. Most of the peat is used for horticultural soil improvement. Peat makes soil more water absorbent and also allows young plant roots to breathe. Two million dollars worth of peat is sold annually from this northern Illinois region.

Peat is a different product than the cash crops mentioned above because it is realistically a non-renewable resource. In other words, peat is being mined faster than it is being produced.

Wetlands are the preferred habitat for hundreds of species of *waterfowl*. Extensive public and private wetlands in Illinois, such as Crab Orchard and Chautauqua National Wildlife Refuges, are in the natural migration flyway of thousands of Canadian geese.

Of the 70,000 acres of Illinois River bottomland, 57,320 acres are owned by private duck clubs. Each duck hunter must purchase a state migratory waterfowl hunting stamp. Statewide, this "duck stamp" provides about $950,000 per year to enhance the state's duck hunting, which includes maintaining wetlands. In Illinois, duck and goose hunters spend more than $60 million annually on hunting. A similar situation exists in Indiana.

Sportsmen in both states spend thousands of days each year fishing for wetland-dependent species of *fish*. These fish use wetlands for spawning, feeding, resting, or hiding. For instance, northern pike spawn in the wetlands in early spring. After hatching, the young pike remain in the wetlands, feeding on small organisms, until they are large enough to leave

the protective cover. In Illinois alone, almost $1.6 billion is spent annually on fishing.

Fur-bearing animals are important products of a wetland. Each year furriers obtain over 284,000 muskrats and over 225,000 raccoons and mink from Indiana wetlands. The muskrat alone produces over two million dollars in revenue in Indiana annually. Moreover, in either Indiana or Illinois, some farms containing extensive wetlands make more profit by leasing the rights to trap and hunt than by raising crops.

With the multitude of plants, animals, and open space, wetlands also offer *aesthetic values* to both lake and riverfront communities, especially in urban areas. In addition to hunting and fishing, thousands of people enjoy wetlands for birdwatching, hiking, photography, and just viewing the scenery.

Many wetlands in Illinois and Indiana contain *endangered species* of plants and animals. In fact, 40 percent of the undisturbed natural habitats in Illinois that contain endangered plants are wetlands. Some examples of beautiful and unusual specimens include orchids and pitcher plants. Nature lovers come to the wetlands to observe herons, shore birds, reptiles, and amphibians, and to glimpse beavers and deer.

Questions:

1. Why is hunting for ducks or trapping for fur a valuable use of wetlands?

2. Wetlands are important to northern pike. Why?

3. How many plants and animals can you name that depend on wetlands for food, shelter, and breeding?

Discussion:

1. In reference to Question 3, discuss how the wetland is important to each type of wildlife, such as for food, cover, or in other ways.

2. Discuss how certain insects, such as mosquitoes, are important in a wetland. Discuss their conflict with humans relative to health problems and the dangers of insecticide controls in wetlands.

Activity 4

Hide and Seek

This activity, involving a fish tank and native Illinois or Indiana fish, should be especially helpful in exploring wetland fisheries.

Materials Needed:

- ☐ A large aquarium (preferably 10 gallons or larger)
- ☐ Several native fish, along with some bottom soil and weeds or grasses which grow in the water where the fish were caught. (Contact your nearest Illinois Department of Conservation or Indiana Department of Natural Resources fishery biologist. He or she will probably be able to supply the live materials. Group members who fish might be encouraged to bring in several freshly-caught fish in a bucket of water.)

Procedure:

1. Arrange your aquarium so that all the grasses and weeds are in the left half of the tank.

2. Introduce the fish. Watch the colors of the fish change as the conditions change. Where do the fish go?

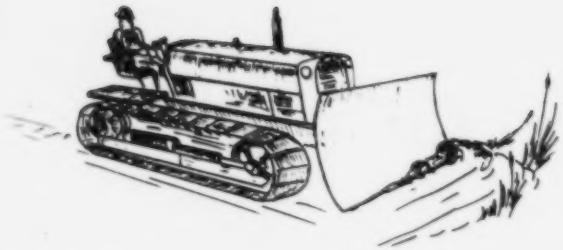
Is there an advantage (especially for the smalier fish) in living among the weeds?

How does this relate to the fact that some marshes are important pike-spawning grounds?

3. Another value of wetlands to young pike involves the *Life in a Wetland Soil* activity. What do very young pike eat? (Answer: Invertebrate animals in the water.) What do these invertebrates eat? (Answer: Microscopic plants in the water.) Can you add any more organisms involved in this "food chain?"

Chapter V

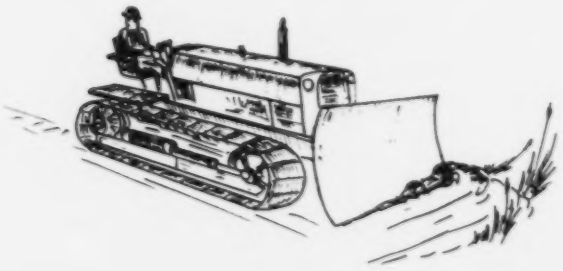
Wetland Destruction



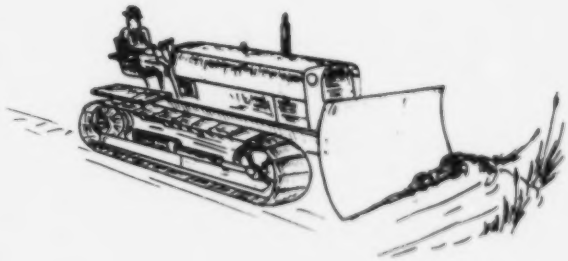
Hundreds of acres of Illinois and Indiana wetlands are destroyed each year. In Illinois, an estimated 4,000-6,000 acres are destroyed annually. In Indiana, five percent of remaining wetlands are lost annually. Already, millions of acres of wetlands have been permanently altered or destroyed in both states since their first settlement.

People are the greatest single destroyer of wetlands because of our diking, draining, filling, and polluting activities.

Currently, the Illinois Department of Conservation estimates that of the 8.2 million acres of wetlands within the state, only 13,000 acres of undisturbed wetlands remain. Eighty-seven percent of the original 8.2 million acres was drained for farmland. A large section of the city of Chicago lies on remnant wetlands of the last ice age.



A study done by the Indiana Department of Natural Resources contained similar findings. Ninety-nine percent of its state wetlands have been changed to some degree, and 86 percent are in fact destroyed. The Kankakee River System which contained two-thirds of all the state's wetlands has been changed over 90 percent by human activities. A large part of the city of Indianapolis sits on former wetland ground.



A study of old maps and records indicates that nationwide, in the lower 48 states, about 54 percent of all the wetlands have been destroyed since pioneers began settling the continent. Wetlands have been viewed as wastelands, and have been drained or filled for agriculture, business, industry, housing, or waste disposal.

Unfortunately, many people do not realize the natural value of wetlands. Usually, this is because they have not had the opportunity to learn about the benefits we receive from wetlands and are aware only of what they consider negative aspects. Because many wetlands have mosquitoes and snakes, they believe this land is not good for anything unless it is filled.

In some cases, there have been benefits from the changes. Wetlands drained for agriculture produce part of our food supply, and those dredged to build harbors provide transportation centers for industry and recreation.

Unfortunately, many wetlands have been destroyed because of their location between lakes or rivers and the land. This location often seemed an important area for homes, harbors, or industries dependent on water transportation.

However, everyone must eventually pay for water quality improvement, erosion control, and fish and wildlife habitat improvement — all of which normally are provided by wetlands.

Wise and informed choices must be made to regulate our use of the remaining wetlands because they are difficult to reestablish. Reestablishing a wetland is usually much more expensive than protecting it from destruction.

Questions:

1. What is one area in Illinois and Indiana that once contained vast expanses of wetlands?

2. Unfortunately, many people consider wetlands as wastelands. Do you know why?

3. Who is the greatest single destroyer of wetlands?

4. Who must eventually pay for the loss of wetlands?

Discussion:

Can you name areas that were once wetlands, but have been destroyed in the past, or are presently being filled, drained, or otherwise destroyed?

Optional:

Select an area (3/4, 1/2, or 1 square mile in size) near your home. Try to determine the amount of wetlands that have been altered or destroyed. This can be done by talking to area farmers, your parents, grandparents, uncles, aunts, area businessmen, or others who have been living in the area for a relatively long period of time. Map the wetlands for this area as they were in the past and how they are at the present time. Also try to predict what will happen to the wetlands in the future, based on adjacent land uses, ownership, etc. Monitor the wetland's use for a period of time and see what changes occur.

Activity 5

Destruction of a Wetland

Learn how easily wetlands can be destroyed. Also learn why this is often a permanent loss of the wetlands.

Materials Needed:

- ☐ The wetland models from *Make Your Own Wetland* in Activity 1
- ☐ About one quart of dry sand or kitty litter
- ☐ Red food coloring

Procedure:

1. *Contamination* — Some people have used wetlands as places to dump wastes. To show what happens when chemical wastes are dumped in wetlands, pretend that the food coloring is a toxic chemical. Place several drops of food coloring at one edge of the container of the sand or clay wetland (easier to see). Blow on the water like wind or swirl it around like a storm would do. What happens? How would a chemical act in a "real" wetland?

2. *Filling* — Have a group member pretend to be a bulldozer (sound effects permitted!) and pour sand onto the next wetland container. What does this do to the wetland? Can this ever be reversed? (Try to get all the sand out of the jar if you think so.)

3. *Drainage* — Draining a wetland takes the "wet" out of "wetland." What is left? Model this by allowing one of the jars to dry out or by pouring out the water. Discuss the effects of drainage on the fish described in Chapter IV.

4. *The Last Wetland* — The group members have now destroyed three out of four wetlands. Remember that the majority of Illinois' and Indiana's original wetlands have been altered or destroyed. What will we do with the remaining wetland? (Answer: Protect it!)

Chapter VI

Wetlands Regulation

In 1977, President Carter called on all federal agencies to aid in protecting wetlands. He directed that no federal funds be spent on projects that directly or indirectly would destroy wetlands unless "no prudent alternative exists."

The United States Fish and Wildlife Service then began a national wetlands inventory to identify all the wetlands. This information will help us make better management decisions for wetlands. Illinois has completed its portion of the national wetlands inventory and put the information on a computer. Indiana is also cooperating with the inventory.

The United States Army Corps of Engineers was given responsibility to regulate the filling of navigable water bodies, and water used in interstate commerce, including wetlands. However that authority only regulates the placement of dredge and fill materials into a wetland, not the drainage of a wetland or the destruction of the plants and animals that live within a wetland.

The Illinois Department of Conservation has been given responsibility to protect and manage Illinois' fish and wildlife. *The Indiana Department of Natural Resources* holds similar responsibilities in Indiana. The Indiana Department of Natural Resources also controls water quality and regulates activities in and adjacent to most larger water bodies. In *Illinois*, the *State Environmental Protection Agency* regulates the water quality program.

Some wetlands are protected under state laws, but only those wetlands lying within narrowly defined areas along a lake or stream. At the present time, wetlands that are not connected in any way to our inland lakes and streams and are not within the 100-yard floodway are not regulated by any specific state law.

Furthermore, the Corps of Engineers and these state agencies do not have the money or the manpower to carry out their regulatory programs. Some individuals will illegally fill a wetland and get away with it unless a neighbor complains.

On the positive side, the Corps of Engineers' regulations do provide for public comment on changes to wetlands. Some alternatives proposed by these comments have been supported by the Corps, and some wetlands have been saved or restored.

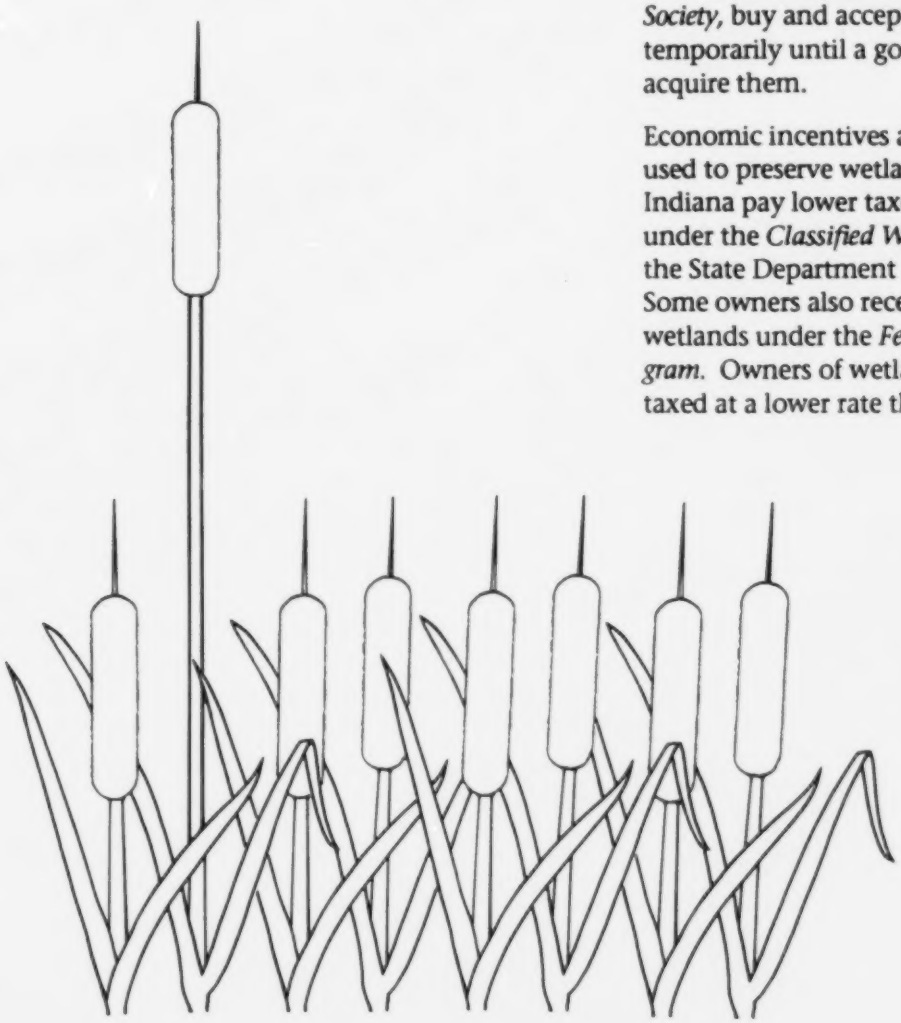
A federal law called the *Endangered Species Act* prohibits any federal agency from funding projects which jeopardize the existence of a threatened or endangered plant or animal. Private landowners and corporations are exempt from this federal law. Illinois has passed the Endangered Species Protection Act which requires consultation with the Department of Conservation before a public action may be taken which will harm a listed species.

Public sentiment is sometimes effectively aroused in support of rare plants and animals. If a landowner is informed that his property is one of the last known locations of a wetland plant or animal, the landowner may take steps to protect it.

Wetlands can be protected by *public acquisition.* It is effective but expensive. Few wetlands have been protected this way in recent years.

In addition to the federal and state wildlife refuges and private duck clubs mentioned in Chapter IV, local forest preserves and park districts can also protect wetlands. In Indiana, state forests and state parks strive to protect wetlands. Private tax-exempt organizations, such as the *Nature Conservancy* and *Audubon Society,* buy and accept wetlands donations temporarily until a government agency can acquire them.

Economic incentives are another alternative used to preserve wetlands. Wetland owners in Indiana pay lower taxes when they are listed under the *Classified Wildlife Habitat Program* of the State Department of Natural Resources. Some owners also receive money to maintain wetlands under the *Federal Water Bank Program.* Owners of wetlands, in Illinois, are taxed at a lower rate than owners of uplands.



Conservationists believe an ideal wetlands protection law would call for an inventory of all Illinois and Indiana wetlands; a determination of their values in order of priority; and more regulation of their uses.

An inventory of the wetlands has been completed in Illinois and is underway in Indiana. Illinois has passed a wetland law which affects the actions funded or carried out by state agencies. Indiana does not have a law that specifically regulates wetlands. Indiana legislators have tried several times to get a law passed, but have had no success.

An effective program is needed to increase public awareness of the value of wetlands. Citizens who realize that wetland losses are often permanent may change their minds about destroying them for developments such as harbors, power plants, industrial sites, shopping centers, or housing subdivisions.

Be a good citizen and report man-made changes in or near wetlands to the nearest Illinois Department of Conservation office or Indiana Department of Natural Resources office.

Discussion:

Consider what is being done to regulate our use of wetlands. Discuss what wetlands in Illinois and Indiana are not being protected by law and what you, as a concerned citizen, could do to better preserve and protect our wetlands.

Optional:

Take some action that will help protect and preserve our wetlands. Call or write your state legislator and federal congressional representative and let them know your opinion about wetland protection and proposed laws.

Activity 6

Guest Speaker

In Illinois, ask a representative from the Illinois Department of Conservation or a spokesperson from your local forest preserve or park district to talk to your group. In Indiana, ask a representative from the Indiana Department of Natural Resources, or a spokesperson from your state forest or state park to talk to your group.

Learn about the history and present status of wetlands regulation and management. Before having the group members write letters to their congressmen, learn what specific recommendations should be made. Your speaker may be able to describe the potential and historical effectiveness of citizens' actions on the political process.

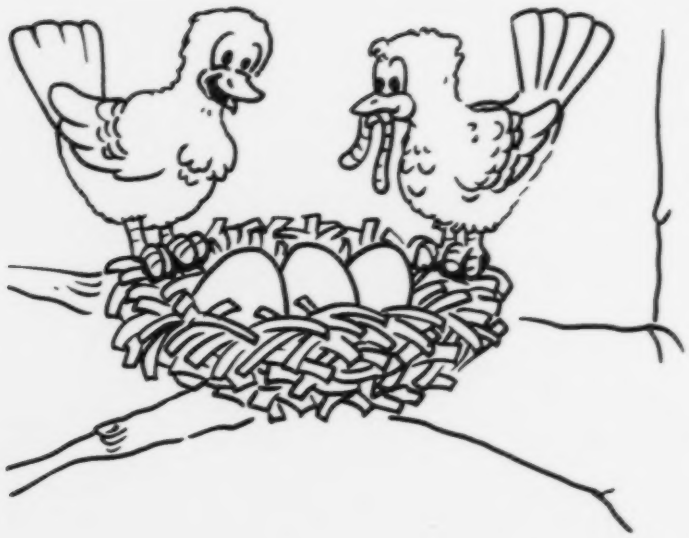
Activity 7

Field Trips

A field trip to a wetland area will tie together much of what you have learned in this guide.

Surprisingly, a field trip can be taken during all seasons because different things can be learned about wetlands at different times of the year. Summer is good for observing wetland activity at its peak. Spring and fall are times to observe many different types of migrating birds. During the heart of winter, most wetlands are frozen over, providing an excellent opportunity to walk in a wetland that would otherwise be too muddy or deep with water. During that walk, homes of wetland animals can be observed up close.

Let an adult leader or teacher familiar with the wetland area you want to explore, guide you; or ask a naturalist from your local, state, or federal parks to guide you. One of them can warn you about potential hazards you may encounter.



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Bell, H.E. III, *Illinois Wetlands; Their Value and Management,* Document No. 81/83 for the Illinois Institute of Natural Resources, October 1981. (Contact your local library.)

Hansen, P., *Chicago's Lake Shore,* Education Department, Field Museum, Chicago. (Contact Field Museum of Natural History, Ph: 312/922-9410)

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Illinois Department of Conservation, *Aquatic Weeds, Their Identification and Methods of Control,* Fishery Bulletin No. 4, 54 pp., Revised 1988. (For a free copy write to Illinois Department of Conservation, Region II Office, 110 James Road, Spring Grove, Illinois 60081, Ph: 815/675-2385.)

Illinois Department of Conservation, *Illinois Wetlands Management Program,* 1986. (A free copy can be obtained from Illinois Department of Conservation, Office of Public Information, P.O. Box CB, 524 South Second Street, Springfield, IL 62701-1787, Ph: 217/782-3715)

Illinois Wetlands Reference Persons

1) Robert Gorden, Professional Scientist
Illinois Natural History Survey
Center for Aquatic Ecology
607 E. Peabody Drive
Champaign, IL 61820
(217)244-5057

2) Stephen Havera, PhD
Center for Wildlife Ecology
Forbes Biological Station
Box 599
Havana, IL 62644
(309)543-3950

3) Marvin Hubbell,
Wetlands Program Administrator
Illinois Department of Conservation
Division of Planning
524 South Second Street
Springfield, IL 62701-1787
(217)782-3715

4) Contact your local County Forest Preserve Districts

Indiana Wetlands Published References

Beecher, W. J., *Tamarack Bogs, Science Notes,* Chicago Academy of Sciences, no date. (Copies can be obtained at 5 cents each from the Chicago Academy of Sciences, Education Department, 2001 North Clark Street, Chicago, Illinois 60614, Ph: 312/871-2668 ext. 2034)

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Indiana Wetlands Reference Person

1) David Turner, Environmental Supervisor
   Indiana Department of Natural Resources
   Division of Fish and Wildlife
   402 W. Washington Street
   P.E.N. Section, Room W273
   Indianapolis, IN 46204-2267
   317/232-4086

2) Contact your County Soil Conservation Service office

General Wetlands References

Lake Michigan Federation, *Preserving Great Lakes Wetlands: An Environmental Agenda,* 78 pp., no date. (Can be ordered at $3.50 each plus $2.00 postage/handling from the Lake Michigan Federation, 59 E. Van Buren St., Suite 2215, Chicago, IL 60605, Ph: 312/939-0838)

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Tip of the Mitt Watershed Council, *Great Lakes Wetlands,* (To subscribe to this free newsletter, write to Wil Cwikiel, editor, Great Lakes Wetlands, P.O. Box 300, Conway, MI 49722)

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Wentz, W.A., *Wetlands Values and Management,* U.S. Fish and Wildlife Service and U.S. Environmental Protection Agency, Washington, D.C., 25 pp., 1981. (For a free copy, contact the South Dakota Cooperative Wildlife Research Unit of the U.S. Fish and Wildlife Service, South Dakota State University, P.O. Box 2206, Brookings, SD 57007, Ph: 605/688-6121)

Zedler, J.B., and R. Langis, *A Manual for Assessing Restored and Natural Coastal Wetlands with Examples from Southern California,* 105 pp., 1990. (Copies can be obtained for $10 each from Dr. Joy Zedler, Pacific Estuarine Research Laboratory, San Diego State University, San Diego, CA 92182-0057. Please make checks payable to PERL Acct. 96885.)

Name _____ Club _____

County _____ Age _____

Illinois 4-H Wetlands Record

Requirements

1. Study your project guide booklet. Then discuss the questions at the end of each chapter with fellow 4-H members, your family, adult leader, or teacher.

2. At the end of each chapter in the guide booklet perform the suggested activity. Because some of the activities are time-consuming, you may wish to enroll in this project for more than one year.

3. After discussing each chapter and performing its activity, complete the following record sheet questions for that chapter.

4. You will receive extra points by providing written answers to the discussion questions found at the end of each chapter or by performing the optional activities at the end of each chapter. You will receive double the extra points by doing both of these additional activities.

5. Have this record sheet reviewed and signed by your 4-H leader.

Be sure to:

1. Start your record as soon as you start your project. Keep it up to date.

2. Keep this record sheet with the other sheets in your record book cover.

3. If you need help, ask your adult leader, junior leader, parent, teacher, or Extension Adviser.

4. Remember that your project record, pictures, newspaper clippings, etc., tell your story.

Chapter I

What is a Wetland?

Date this chapter was started _____ Date competed _____

1. What is a wetland? _____

_____

_____

_____

2. Name four ways in which a wetland can form. _____

_____

_____

_____

3. From Activity 1 — *Make Your Own Wetland*

Match the words using arrows:

SAND	FAST-DRAINING	PONDS
LOAM	LOW-DRAINING	MARSHES
CLAY	WATER-ABSORBING	FAST RIVERS

Chapter II

Value of Wetlands

Date this chapter was started _____ Date completed _____

1. Identify four important values of wetlands. _____

_____

_____

_____

2. Describe how wetlands naturally purify water. _____

_____

_____

_____

From Activity 2 — *Life in a Wetland Soil*

Name four life forms that emerged from the wetland soil and where each came from:

NAME: LOCATION:

1. _____

2. _____

3. _____

4. _____

Chapter III

Wetland Types

Date this chapter was started _____ Date completed _____

1. What is the difference between a pond and a marsh? _____

_____

_____

_____

_____

2. Give some examples of ponds and marshes you know of, particularly any that are close to your neighborhood.

_____

_____

_____

3. From Activity 3 — *Types of Wetlands*

Attach two pictures or photographs of wetlands and identify each. If the pictures are too big, draw an example pointing out important features.

Chapter IV

Products From Wetlands

Date this chapter was started _____ Date completed _____

1. Name three products that man commercially grows in wetlands. _____

_____

_____

_____

2. Name three products that are naturally found in wetlands. _____

_____

_____

_____

3. From Activity 4 — *Hide and Seek*

Give two different reasons why small fish prefer living in wetlands. _____

_____

_____

Chapter V

Wetland Destruction

Date this chapter was started _____ Date completed _____

1. What percent of Illinois wetlands and Indiana wetlands have been destroyed by people?

Illinois: _____ Indiana: _____

2. Give three reasons why people have destroyed wetlands. _____

_____

_____

_____

3. From Activity 5 — *Destruction of a Wetland*

Can an entire wetland become polluted when pollutants are added to only one corner of it? Why?

_____

_____

_____

_____

Chapter VI

Wetland Regulation

Date this chapter was started _____ Date completed _____

1. Name three governmental agencies that regulate wetlands and how each does it. _____

_____

_____

_____

2. Describe three other ways that people protect wetlands. _____

_____

_____

_____

3. From Activity 6 or 7 — *Guest Speaker — Field Trip*

Who was your guest speaker, or where did you go on your field trip? Describe something new you learned from your guest speaker or field trip.

_____

_____

_____

List additional articles other than your project guide booklet that you have read related to this project.

_____

_____

_____

List additional meetings or events which you attended related to this project. _____

_____

_____

Describe any assistance you provided other club members, family members, friends, relatives, or other persons in your community related to wetlands.

_____

_____

Talks or demonstrations you gave on this project:

Title _____ Place _____ Date _____

Title _____ Place _____ Date _____

Title _____ Place _____ Date _____

Exhibit a project at one of the following: (List rating if one was received.)

Local club achievement program _____ County fair or club show _____

State Fair _____ Other (please specify name) _____

Member's Signature _____

Leader's Signature _____

Urbana, Illinois January 1992

Issued in furtherance of the Cooperative Extension Work, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture. Donald Uchtmann, Director, Cooperative Extension Service, University of Illinois at Urbana-Champaign.

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